Amendments to the Claims:

The following Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently amended) A method comprising:
bringing a fluid into contact with the surface of a surface acoustic wave sensor;
propagating input waves through the surface acoustic wave sensor to produce transmitted waves;
determining a phase frequency response of the transmitted waves;
identifying a segment of phase frequency response ~~of a surface acoustic wave sensor~~ by determining first and second phase inflection frequencies, +180 and -180 degree, proximate to a running frequency associated with the surface acoustic wave sensor; ~~and~~
estimating a time delay associated with wave propagation through the surface acoustic wave sensor based on the identified segment of phase frequency response;
identifying a material in the fluid as a function of an estimated propagation velocity, the estimated propagation velocity being estimated based on the estimated time delay.

2. (Canceled)

3. (Currently amended) The method of claim 1 ~~2~~, wherein determining phase inflection frequencies comprises:
sampling a plurality of phase responses at frequencies proximate to the running frequency and initially estimating phase inflection frequencies as a function of the plurality of phase responses at frequencies proximate to the running frequency;
sampling a plurality of phase responses at frequencies proximate to the initially estimated phase inflection frequencies; and

more accurately estimating the phase inflection frequencies as a function of the plurality of phase responses at frequencies proximate to the initially estimated phase inflection frequencies.

4. (Currently amended) The method of claim 1 ~~2~~, wherein the first and second phase inflection frequencies define edges of a monotonically changing subset of a graph of phase versus frequency of the surface acoustic wave sensor.

5. (Currently amended) ~~The~~ A method ~~of claim 2, further~~ comprising:
identifying a segment of phase frequency response of a surface acoustic wave sensor by determining first and second phase inflection frequencies proximate to a running frequency associated with the surface acoustic wave sensor; and
estimating the time delay associated with wave propagation through the surface acoustic wave sensor based on the identified segment of phase frequency response according to approximately the following equation:

$$\hat{\tau}(f_0) = \frac{f_1}{f_0}\frac{1}{f_2 - f_1} - \frac{1}{360}\frac{\phi(f_0)}{f_0} + \frac{0.5}{f_0}$$ where $\hat{\tau}(f_0)$ is the time delay at frequency f_0, f_0 is the running frequency, f_1 is the first phase inflection frequency, f_2 is the second phase inflection frequency, and $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor at frequency f_0.

6. (Withdrawn) The method of claim 1, further comprising estimating the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = -\frac{1}{360}\frac{f_*}{f_0}\dot{\phi}(f_*) - \frac{1}{360}\frac{1}{f_0}\phi(f_0) + \frac{1}{360}\frac{1}{f_0}\phi(f_*)$$

where $\hat{\tau}(f_0)$ is the time delay, f_0 is a running frequency, $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor, f_* is any frequency between a first phase inflection frequency and a second phase inflection frequency, $\phi(f_*)$ is a measured phase frequency response at the frequency f_*, and $\dot{\phi}(f_*)$ is a first order of derivative of the measured phase response at the frequency f_*.

7. (Withdrawn) The method of claim 1, further comprising estimating the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = -\frac{1}{360}\dot{\phi}(f_0)$$

where $\hat{\tau}(f_0)$ is the time delay, and $\dot{\phi}(f_0)$ is a first order of derivative of a measured phase response at a frequency f_0.

8. (Withdrawn) The method of claim 1, further comprising estimating the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = \frac{1}{f_0}\frac{f_1}{f_2 - f_1} - \frac{1}{360}\frac{1}{f_0}\phi(f_0) + \frac{0.5}{f_0} + \frac{1}{180}\frac{1}{f_0}\frac{1}{f_2 - f_1}\int_{f_1}^{f_2}\phi(f_{00})df_{00}$$

where $\hat{\tau}(f_0)$ is the time delay, f_0 is an operating frequency, f_1 is a first phase inflection frequency, f_2 is a second phase inflection frequency, and $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor, integral $\int_{f_1}^{f_2}\phi(f_{00})df_{00}$ is equal to integral $\int_{f_1}^{f_2}\phi(f)df$, where $\phi(f)$ is a measured phase response at frequency f and f varies from f_1 to f_2.

9. (Original) The method of claim 1, further comprising estimating a propagation velocity of a surface acoustic wave through the surface acoustic wave sensor from an estimated time delay according to the following equation:

$\hat{v}(f) = \frac{L}{\hat{\tau}(f)}$, where $\hat{v}(f)$ is an estimated propagation velocity of the surface acoustic wave at frequency f, $\hat{\tau}(f)$ is the estimated time delay at the frequency f, and L is a distance between centers of an input inter-digitized transducer (IDT) and an output IDT.

10. (Canceled)

11. (Original) The method of claim 1, wherein the surface acoustic wave sensor comprises a Love mode shear-horizontal surface acoustic wave sensor.

12. (Currently amended) A computer-readable medium comprising instructions that when executed in a processor:
determine phase frequency response of the transmitted waves of a surface acoustic wave sensor;
identify a segment of phase frequency response of ~~a~~ the surface acoustic wave sensor by determining first and second phase inflection frequencies proximate to a running frequency associated with the surface acoustic wave sensor; and
estimate a time delay associated with wave propagation through the surface acoustic wave sensor based on the identified frequency response according to approximately the following equation:

$$\hat{\tau}(f_0) = \frac{f_1}{f_0}\frac{1}{f_2 - f_1} - \frac{1}{360}\frac{\phi(f_0)}{f_0} + \frac{0.5}{f_0}$$

where $\hat{\tau}(f_0)$ is the time delay at frequency f_0, f_0 is the running frequency, f_1 is the first phase inflection frequency, f_2 is the second phase inflection frequency, and $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor at the running frequency f_0.

13. (Canceled)

14. (Currently amended) The computer-readable medium of claim 12 ~~13~~, further comprising instructions that when executed determine phase inflection frequencies for a discrete phase frequency response by:
sampling a plurality of phase responses at frequencies proximate to the running frequency and initially estimating phase inflection frequencies as a function of the plurality of phase responses at frequencies proximate to the running frequency;
sampling a plurality of phase responses at frequencies proximate to the initially estimated phase inflection frequencies; and

more accurately estimating phase inflection frequencies as a function of the plurality of phase responses at frequencies proximate to the initially estimated phase inflection frequencies.

15. (Currently amended) The computer-readable medium of claim 12 ~~13~~, wherein the first and second phase inflection frequencies define edges of a monotonically changing subset of a graph of phase versus frequency of the surface acoustic wave sensor.

16. (Canceled)

17. (Withdrawn) The computer-readable medium of claim 12, further comprising instructions that when executed estimate the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = -\frac{1}{360}\frac{f_*}{f_0}\dot{\phi}(f_*) - \frac{1}{360}\frac{1}{f_0}\phi(f_0) + \frac{1}{360}\frac{1}{f_0}\phi(f_*)$$

where $\hat{\tau}(f_0)$ is the time delay, f_0 is a running frequency, $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor, f_* is any frequency between a first phase inflection frequency and a second phase inflection frequency, $\phi(f_*)$ is a measured phase frequency response at the frequency f_*, and $\dot{\phi}(f_*)$ is a first order of derivative of the measured phase frequency response at the frequency f_*.

18. (Withdrawn) The computer-readable medium of claim 12, further comprising instructions that when executed estimate the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = -\frac{1}{360}\dot{\phi}(f_0)$$

where $\hat{\tau}(f_0)$ is the time delay, and $\dot{\phi}(f_0)$ is a first order of derivative of a measured phase response at a frequency f_0.

19. (Withdrawn) The computer-readable medium of claim 12, further comprising instructions that when executed estimate the time delay according to approximately the following equation:

$\hat{\tau}(f_0) = \frac{1}{f_0}\frac{f_1}{f_2 - f_1} - \frac{1}{360}\frac{1}{f_0}\phi(f_0) + \frac{0.5}{f_0} + \frac{1}{180}\frac{1}{f_0}\frac{1}{f_2 - f_1}\int_{f_1}^{f_2}\phi(f_{00})df_{00}$ where $\hat{\tau}(f_0)$ is the time delay, f_0 is an operating frequency, f_1 is a first phase inflection frequency, f_2 is a second phase inflection frequency, $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor, integral $\int_{f_1}^{f_2}\phi(f_{00})df_{00}$ is equal to integral $\int_{f_1}^{f_2}\phi(f)df$, where $\phi(f)$ is a measured phase response at a frequency f and f varies from f_1 to f_2.

20. (Original) The computer-readable medium of claim 12, further comprising instructions that when executed estimate a propagation velocity of the surface acoustic wave from the estimated time delay according to the following equation:

$\hat{v}(f) = \frac{L}{\hat{\tau}(f)}$, where $\hat{v}(f)$ is the estimated propagation velocity of the surface acoustic wave at frequency f, $\hat{\tau}(f)$ is the estimated time delay at frequency f, and L is a distance between centers of an input inter-digitized transducer IDT and an output IDT.

21. (Original) The computer-readable medium of claim 12, further comprising instructions that when executed identify a concentration of a material in a fluid as a function of an estimated propagation velocity, the estimated propagation velocity being estimated based on the estimated time delay.

22. (Original) The computer-readable medium of claim 12, wherein the surface acoustic wave sensor comprises a Love mode shear-horizontal surface acoustic wave sensor.

23. (Currently amended) A system comprising:

a surface acoustic wave sensor;

a sensor analyzer to receive output of the surface acoustic wave sensor <u>and determine a phase frequency response from the output</u>; and

a processor to receive input from the sensor analyzer, identify a segment of phase frequency response of a surface acoustic wave sensor, estimate a time delay associated with wave propagation through the surface acoustic wave sensor based on the identified segment of phase frequency response according to approximately the following equation: $\hat{\tau}(f_0) = \frac{f_1}{f_0}\frac{1}{f_2 - f_1} - \frac{1}{360}\frac{\phi(f_0)}{f_0} + \frac{0.5}{f_0}$ where $\hat{\tau}(f_0)$ is the time delay at frequency f_0, f_0 is the running frequency, f_1 is the first phase inflection frequency, f_2 is the second phase inflection frequency, and $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor at the running frequency f_0, and estimate a propagation velocity of the surface acoustic wave based on the estimated time delay.

24. (Original) The system of claim 23, wherein the processor identifies the segment of phase frequency response by determining first and second phase inflection frequencies proximate to a running frequency associated with the surface acoustic wave sensor.

25. (Original) The system of claim 24, wherein the processor determines the phase inflection frequencies by:

sampling a plurality of phase responses at frequencies proximate to the running frequency and initially estimating the phase inflection frequencies as a function of the plurality of phase responses at frequencies proximate to the running frequency;

sampling a plurality of phase responses at frequencies proximate to the initially estimated phase inflection frequencies; and

more accurately estimating the phase inflection frequencies as a function of the plurality of phase responses at frequencies proximate to the initially estimated phase inflection frequencies.

26. (Original) The system of claim 24, wherein the first and second phase inflection frequencies define edges of a monotonically changing subset of a graph of phase versus frequency of the surface acoustic wave sensor.

27. (Canceled)

28. (Withdrawn) The system of claim 23, wherein the processor estimates the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = -\frac{1}{360}\frac{f_*}{f_0}\dot{\phi}(f_*) - \frac{1}{360}\frac{1}{f_0}\phi(f_0) + \frac{1}{360}\frac{1}{f_0}\phi(f_*)$$

where $\hat{\tau}(f_0)$ is the time delay, f_0 is a running frequency, $\phi(f_0)$ is a measured phase response of the surface acoustic wave sensor, f_* is any frequency between a first phase inflection frequency and a second phase inflection frequency, $\phi(f_*)$ is a measured phase frequency response at the running frequency f_*, and $\dot{\phi}(f_*)$ is a first order of derivative of the measured phase frequency response at the running frequency f_*.

29. (Withdrawn) The system of claim 23, wherein the processor estimates the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = -\frac{1}{360}\dot{\phi}(f_0)$$

where $\hat{\tau}(f_0)$ is the time delay, and $\dot{\phi}(f_0)$ is a first order of derivative of a measured phase response at frequency f_0.

30. (Withdrawn) The system of claim 23, wherein the processor estimates the time delay according to approximately the following equation:

$$\hat{\tau}(f_0) = \frac{1}{f_0}\frac{f_1}{f_2 - f_1} - \frac{1}{360}\frac{1}{f_0}\phi(f_0) + \frac{0.5}{f_0} + \frac{1}{180}\frac{1}{f_0}\frac{1}{f_2 - f_1}\int_{f_1}^{f_2}\phi(f_{00})df_{00}$$

where $\hat{\tau}(f_0)$ is the time delay, f_0 is an operating frequency, f_1 is a first phase inflection frequency, f_2 is a second phase inflection frequency, and $\phi(f_0)$ is a measured phase response of

the surface acoustic wave sensor, integral $\int_{f_1}^{f_2} \phi(f_{00})df_{00}$ is equal to integral $\int_{f_1}^{f_2} \phi(f)df$, where $\phi(f)$ is a measured phase response at frequency f ,and f varies from f_1 to f_2.

31. (Original) The system of claim 23, wherein the processor estimates a propagation velocity of the surface acoustic wave based on the estimated time delay according to the following equation:

$\hat{v}(f) = \frac{L}{\hat{\tau}(f)}$, where $\hat{v}(f)$ is an estimated propagation velocity of the surface acoustic wave at a frequency f , $\hat{\tau}(f)$ is the estimated time delay at the frequency f , and L is a distance between centers of an input inter-digitized transducer IDT and an output IDT.

32. (Original) The system of claim 23, wherein the processor estimates a propagation velocity based on the estimated time delay.

33. (Original) The system of claim 32, wherein the processor identifies a concentration of a material in a fluid as a function of the estimated propagation velocity.

34. (Original) The system of claim 23, wherein the surface acoustic wave sensor comprises a Love mode shear-horizontal surface acoustic wave sensor.